

The Ricochet Wireless Network Overview

About Metricom, Inc.

Founded in 1985, Metricom provides wireless data communications and network solutions for personal computer and industrial applications. The firm, headquartered in Los Gatos, California, develops license-free, high-performance products that feature advanced, spread-spectrum packet radio technology, which sends data across a network of intelligent radio nodes.

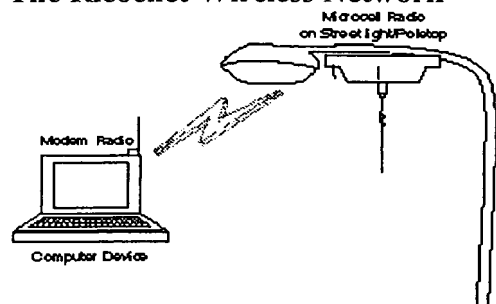
Metricom's Ricochet division provides wireless access and communications solutions for groups and individuals using computers in the corporate, consumer and education market sectors. Ricochet offers affordable monthly subscriptions to its wireless service at flat rates which includes internet and e-mail accounts with unlimited usage. Subscribers can also access corporate LANs and intranets, on-line services such as America Online and CompuServe with additional options.

Ricochet wireless modems can be rented, leased, or purchased. Today, Ricochet is used in the greater San Francisco Bay Area, Seattle and Washington, D.C., 10 university campuses, 100 K-12 schools, and the Sun Microsystems corporate campus. Expansion to targeted metropolitan areas is underway.

The UtiliNet division of Metricom offers wide-area wireless network solutions to the electric, oil, gas and waste management industries with over 40 installations to date. UtiliNet products help customers to efficiently and cost effectively automate process control/monitoring where wired and licensed communications alternatives are cost prohibitive or impractical.

- improved **flexibility** (Wherever, Whenever you need to connect)
- **ease-of-use** (works with most existing computers and communications software)
- all-in-one box **convenience** (Internet & E-mail accounts w/unlimited usage included)
- **affordability** (one low monthly flat rate for everything you need)
- increased **productivity** (no waiting for phone line availability)

The Ricochet Wireless Network



The Ricochet Network is a wide-area wireless system using spread-spectrum, packet-switching data technology and Metricom's patented **frequency-hopping**, mesh architecture. The network operates within the license-free (902-928 MHz) portion of the **Radio Frequency (RF)** spectrum, providing Ricochet subscribers with an affordable wireless solution and an alternative to standard telephone modems requiring phone line connections.

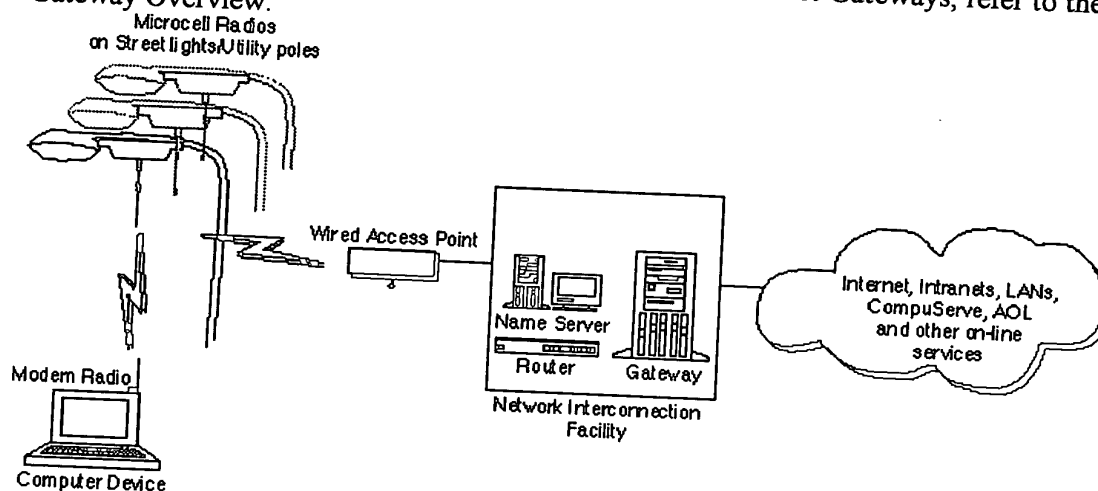
The Ricochet network consists of shoebox-sized radio transceivers, also called **Microcell Radios**, which are typically mounted to street lights or utility poles. The microcells require only a small amount of power from the street light itself (connected with a special adapter) and are otherwise self-contained units (no other wiring or connections are necessary).

They are strategically placed every quarter to half mile in a checkerboard pattern. Each Microcell Radio employs 162 frequency-hopping channels, and uses a randomly selected hopping sequence. This

allows for a very secure network and enables many subscribers to be using the network at the same time. Installation of each Microcell Radio takes less than five minutes.

Within a 20-square mile radius (containing about 100 Microcell Radios) Ricochet installs Wired Access Points, or WAPs, which collect and convert the RF packets into a format for transmission to the wired IP network backbone, through a T1 frame-relay connection. Radio packets are routed from Microcell Radio to Microcell Radio through the Ricochet network in the most efficient manner possible. Each WAP and the Microcells Radios that report to it can support thousands of subscribers.

Consequently, data packets between a Ricochet modem and Microcell Radio may take different routes during transmission. They can be routed to another Ricochet modem or to one of the gateways which allows subscribers to access other services. Currently, Ricochet supports gateways to the Internet, to the telephone system, to an X.25 network or to corporate Intranets or LANs. The telephone system gateway provides Telephone Modem Access. TMA can also be used to connect to on-line services such as AOL and CompuServe. For more details about Ricochet Gateways, refer to the Ricochet Gateway Overview.



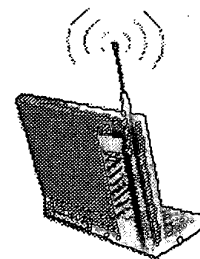
Ricochet is a digital packet-switching radio network with a nationwide wired backbone. The wired backbone is based on conventional IP technology and routes traffic throughout a metropolitan service area or through Ricochet's Network Interconnect Facilities, or NIFs, if the packet has to travel across country. A NIF is simply a router, which gathers data packets from the WAPs, with a few large leased lines which connect it with other NIFs in other metropolitan service areas.

An integral piece of the Ricochet Network backbone is the Name Server, which provides connection validation and path information. All connection requests from a Ricochet modem must first be validated by the Name Server. This automatically occurs every time a Ricochet modem is powered on. Ricochet modems used in peer-to-peer mode do not require Name Server validation.

The Ricochet Wireless Modem

The Ricochet modem weighs 13 ounces, about the size of a television remote control, and plugs directly into a desktop, laptop or PDA standard serial port. Subscribers to the Ricochet service can make modem connections anywhere within a coverage area. Ricochet modems can also communicate with other Ricochet modems on a peer-to-peer basis outside the service area.

The modem is compatible with both Macintosh and Intel-based hardware platforms; Macintosh, Windows 3.1 and Windows 95 operating systems; and most communications software - eliminating the need for additional middleware.



For more information check the [Ricochet Home Page](#).

Glossary

Frequency-hopping	This relates to the technology used when moving RF data packets from one frequency to another.
Intranet	The Intranet is a company's internal on-line site, often protected by firewalls if connected to the Internet. Intranet users must have special authorization in order to access private and sensitive information and data bases.
IP	Internet Protocol consists of procedures and rules for communicating over the Internet.
kbps	kilobits per second indicates the rate of speed data is being transferred (corresponding to 1,024 bits per second).
LAN	A Local Area Network is a communications arrangement that connects multiple computer and related products in an office, building or campus environment by means of a standard transmission medium (e.g., coaxial cable, twisted-pair wire or optical fiber).
MCDN*	The MicroCellular Digital Network is foundation of the wireless architecture Ricochet uses. It is comprised of four primary technology elements: the 902-928 MHz frequency band, spread-spectrum/frequency-hopping, packet-switched networking and protocols for transmitting and receiving data.
Microcell Radio*	Also known as Radio Transceivers, Microcell Radios are shoe-box sized repeaters designed to received RF packets from Ricochet modems or other Microcell Radios. They are generally deployed in clusters from one-half to two miles apart in a mesh topology.
Modem Radio*	A subscriber device that connects to most desktop, laptop or palmtop computing devices through a serial port. The modem allows transmission and reception of RF data being sent through the Ricochet Network (MCDN).
Name Server	A sophisticated database that serves as the gatekeeper to the Ricochet Network (MCDN), monitoring all Microcell Radios and Modem Radios accessing the network and ensuring that they are authorized for specific areas of access. The Name Server takes requests to find radios by name and returns the destination network address needed to route packets to them.
NIF*	The Network Interconnection Facility connects the Ricochet wired network to other major networks, including the Internet, a variety of corporate and university LANS and major online services such as AOL and CompuServe. It also provides control and maintenance for the metropolitan Wide Area Network (WAN).
Packet-switching	A data transmission technique whereby user information is segmented and routed in discrete data envelopes called "packets," each with its own control information for routing, sequencing, and error checking. Packet switching allows a communications channel to be shared by multiple users, each using the circuit only for the time required to transmit a single packet.

RF	Radio Frequency describes the number of time per second a radio wave vibrates (900MHz).
Router	This device connects two or more local area networks or network segments. Routers provide remote access and improve overall network performance by identifying the destination of a packet of information and sends the information along. If the information is being sent to a modem off-campus and in the Ricochet "cloud," it forwards information through the CSU/DSU. Otherwise, it sends the information to a collection of Ethernet radios through the hub and EPDU.
TMA*	Telephone Modem Access is a feature offered in the Preferred and Elite option service packages that allows a Ricochet modem to dial any other phone-line modem and connect to it as a standard wired modem does.
WAP*	<p>A Wired Access Point is comprised of a set of components used to move RF packets across the Ricochet network to the IP wired backbone. These components include a router, Channel and Data Service Units (CSU/DSU), a hub, an Ethernet Power Distribution Unit (EPDU) and Ethernet radios. For more details about these components, refer to the Ricochet Gateway Overview.</p> <p>WAPs first convert data packets into protocol that can be sent wirelessly from one microcell radio to another; then route the packets to other WAPs or NIFs, ensuring that the data reaches its location.</p>

* Indicates Metricom terminology

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